UNITED STATES PATENT OFFICE.

WILLIAM S. SUTHERLAND, OF COOMB'S WOOD, HALESOWEN, ENGLAND.

IMPROVEMENT IN PROCESSES FOR PREPARING GASEOUS FUEL.

Specification forming part of Letters Patent No. **206,643**, dated July 30, 1878; application filed March 12, 1877; patented in England, May 20, 1874.

To all whom it may concern:

Be it known that I, WILLIAM SEDDON SUTHERLAND, of Coomb's Wood, Halesowen, in the county of Worcester, England, engineer, have invented a new and useful method of obtaining heat by the combustion of gaseous fuel and atmospheric air for welding and like purposes, for which English Patent No. 1,784, of 1874, was granted, and which method is fully set forth in the following specification.

This invention relates to obtaining heat for welding and like purposes by the combustion of an inflammable gas or inflammable gases, such as coal-gas, carbureted-hydrogen gas, and carbonic-oxide gas, hereinafter called "gaseous fuel," with atmospheric air.

Hitherto, when large quantities of gaseous fuel and atmospheric air in combustion have been employed—say for the heating of masses of iron or steel to be welded—it has been the practice to maintain such gaseous fuel separated from and unmixed with atmospheric air, except in such quantity that combustion could not take place until the said gaseous fuel became mixed with a supply of atmospheric air at the point where it was desired that combustion should take place.

When gaseous fuel is employed in the manner above described there is loss of heat from imperfect combustion, in consequence of the gaseous fuel and the atmospheric air necessary for complete combustion not being diffused, mixed, or intermingled to the requisite degree; and, further, a reduction of temperature takes place on account of the excessive quantity of atmospheric air, which, of a necessity, comes in contact with and is carried along by the burning fuel.

Now, my invention has for its object to insure a more complete combustion of the gaseous fuel without any unnecessary admixture of atmospheric air, so as to obtain a greater degree and quantity of heat from a given amount of fuel than has been done.

The process or method by which I secure the above-mentioned advantages consists in allowing the gaseous fuel and atmospheric air to become thoroughly and intimately mixed in the proportions necessary for complete combustion, either in a mixing-chamber or in any other desired appliance. The mixed gaseous fuel and air are then propelled, by means of a blowing-engine or other suitable apparatus, along a way or passage to the point where ignition and combustion are to take place. The forward travel of the mixed gaseous fuel and air is maintained at an equal or slightly greater speed than the tendency of the flame to travel back through the mixed gaseous fuel and air.

By the above method of treating the gaseous fuel and atmospheric air combustion takes place without the admixture of any unnecessary quantity of atmospheric air with the gaseous fuel, and loss of heat, due to imperfect combustion and raising the temperature of unused air, is avoided.

In practice I find that the speed of forward travel of the gaseous fuel and air, when coal-gas is used, should not be less than thirty-two feet per second. When carbonic oxide is used a much less velocity is necessary. In fact, when mixed carbonic oxide and air are employed a pressure of a quarter of a pound to the square inch will cause the gaseous fuel and air to travel forward with sufficient velocity.

I am aware that a mixing-chamber composed of a series of communicating chambers, or a single mixing-chamber divided by perforated walls, in combination with a surrounding air-chamber provided with means for the admission of combustible gases, has been heretofore devised and shown in the patent of Eames, No. 137,132, March 25, 1873, and do not claim such subject-matter.

What I claim is—

The process or method herein set forth for obtaining heat from the combustion of gaseous fuel and atmospheric air, when such gaseous fuel and air are intimately mixed together in the proportions necessary for complete combustion previous to ignition, and are caused to travel toward the point of ignition at such a speed as will prevent the back travel of the flame.

WILLIAM SEDDON SUTHERLAND.

Witnesses:

J. JOHNSON,

W. B. JOHNSON.